National Seminar on Moisture Sensitivity of Asphalt Pavements

Breakout Session 1

Fundamentals

Basic Influences on Moisture Sensitivity

Chemical

Physical

Mechanical

Basic Influences on Moisture Sensitivity

- *Chemical*
  - *Bonding/De-bonding*
  - *Adhesive*
  - *Cohesive – Asphalt or Aggregate*
- *Physical*
  - *Rugosity-Surface Area-Absorption*
- *Mechanical*
  - *Stone Breaking*
  - *Scrubbing*

Chemical

Clay – Dust – Filler

Mastic Failure

Salt in Binder

Aggregate Aging

Molecular Orientation - Time

Physical

Water Transport/Permeability

Environment

Aggregate Morphology Absorptivity

Diffusion of Moisture

Stiffening – Viscosity – Diffusivity

Stiffening - Aging

Mechanical /Construction

Density Issues

Drainage

Film Thickness

Trapped Moisture

Mechanical Working – Cracking

Under Compaction

Mechanisms of Moisture Damage

Emulsification

Adhesive Failure

Cohesive Failure

Mechanisms of Moisture Damage

- *Emulsification*
  - *Clay, Dust, Filler*
  - *Salts in Asphalt*
- *Adhesive Failure*
  - *Aggregate Aging*
  - *Molecular Orientation at Interface*
- *Cohesive Failure*
  - *Water Absorption – Molecular Orientation*
  - *Mastic*
  - *Aggregate*

Best Practices

- *Testing and Specifications*
  - *Hamburg – Addresses all Mechanisms*
  - *Aggregate*
    - *Methylene Blue*
    - *Hydrometer*
    - *Soundness*
    - *Sand Equivalent*
  - *PG After Additives*

Best Practices

Prevention

- *Density – Drainage*
- *Avoid Marginal Material Combinations*
- *Mix Design – Including Additives*
- *QC/QA Including Behind Paver Sampling*

Research to Address Gaps and Barriers

Hamburg – Optimize/Standardize

New /Existing Test Methods for Research

Methylene Blue – Optimize/Standardize

Testing Protocol for Aggregate

Emulsifiability of Asphalt

- *Funnel – Bitumatic*
- *Salts – NAPT, ICP*

Pessimum Voids – Emulsification

Research to Address Gaps and Barriers

Adhesive Failure

- *Surface Energy – Measurement Method*

Cohesive Failure

- *Bitumen or Mastic*
  - *Heithaus*
  - *Pull Off*
  - *Water Absorption and Diffusion Test*

Aggregate

- *ECS – ICP - Solubility*

Strategic Plan

Circulate Results for Comment/Suggestion
Establish TWGs to Address Research Needs
TRB Synthesis
Field Sections for Validation
AASHTO Presentation
TRB/ASTM Symposium
Additional Technology Transfer